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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,854	10/29/2003	Masaki Iijima	244632US3	5703

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EXAMINER	
HANDAL, KAITY V	
ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/694,854	IIJIMA ET AL.	
	Examiner	Art Unit	
	Kaity Handal	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,6,7,10 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 6, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,486,218 B2) in view of Fujiii et al. (5,344,627).

With respect to claims 1 and 6, Kobayashi teaches a synthetic gas manufacturing plant (apparatus and method) comprising: a reformer (fig. 1, 10) having a reaction tube (11), a combustion radiation unit (12) arranged around the reaction tube (11) to heat the reaction tube (11), and a convection unit (13) communicating with the combustion radiation unit (12); a source gas supply passageway (20_2) to supply a natural gas to the reformer (10); a steam supply passageway (20_3) to supply steam to the source gas supply passageway (20_2); a carbon dioxide recovery apparatus (31) to which a total amount of combustion exhaust gas flowing through the convection unit (13) of the reformer (10) is supplied, and which recovers carbon dioxide from the combustion exhaust gas; a compressor (32) to and compress the recovered carbon dioxide; a return passageway (20_6) to supply part or the whole of the compressed carbon dioxide from the compressor (32) to the source gas supply passageway.

Kobayashi discloses all claim limitations as set forth above but fails to show wherein said compressor is driven by a steam turbine. Fujiii teaches a system for removing carbon dioxide from a combustion exhaust comprising compressors to compress the carbon dioxide and comprising a steam turbine in order to drive the compressors (col. 4, lines 3-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a steam turbine in Kobayashi's apparatus, as taught by Fujiii, in order to drive the compressors.

Kobayashi further teaches a system comprising a heat exchanger (fig. 1, 51) to generate steam by exchanging heat between a synthetic gas (20_7) synthesized by the reformer (10) and water (20_8) in order to generate high pressure steam (col. 3, lines 49-52). Since Kobayashi, as modified by Fujii, is using a steam turbine to drive the compressor (32), then it would be obvious to make use of the high pressure steam generated in Kobayashi's heat exchanger (51) and supply it to the steam turbine in order to drive the compressor (32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make use of the high pressure steam generated in Kobayashi's heat exchanger by exchanging heat between a synthetic gas synthesized by the reformer and water, and to supply the high pressure steam to the steam turbine in Kobayashi as modified in order to drive the compressor.

With respect to claim 11, Kobayashi teaches wherein the manufactured synthetic gas (20_7) is used in synthesis of methanol (col. 3, lines 38-41).

3. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al. (US 6,726,852 B2) in view of Fujiii et al. (5,344,627).

With respect to claims 1 and 6, Iijima teaches a synthetic gas manufacturing plant (apparatus and method) comprising: a reformer (fig. 1, 10) having a reaction tube (11), a combustion radiation unit (12) arranged around the reaction tube (11) to heat the reaction tube (11), and a convection unit (13) communicating with the combustion radiation unit (12); a source gas supply passageway (20_2) to supply a natural gas to the reformer (10); a steam supply passageway (20_4) to supply steam to the source gas supply passageway (20_2); a carbon dioxide recovery apparatus (51_1) to which a total amount of combustion exhaust gas flowing through the convection unit (13) of the reformer (10) is supplied, and which recovers carbon dioxide from the combustion exhaust gas; a compressor (S2) to and compress the recovered carbon dioxide; a return passageway (20_6) to supply part or the whole of the compressed carbon dioxide from the compressor (S2) to the source gas supply passageway.

Iijima discloses all claim limitations as set forth above but fails to show wherein said compressor is driven by a steam turbine. Fujiii teaches a system for removing carbon dioxide from a combustion exhaust comprising compressors to compress the carbon dioxide and comprising a steam turbine in order to drive the compressors (col. 4, lines 3-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a steam turbine in Iijima's apparatus, as taught by Fujiii, in order to drive the compressors.

Iijima further teaches a system comprising a heat exchanger (fig. 1, 54) to generate steam by exchanging heat between a synthetic gas (20_7) synthesized by the reformer (10) and water (20_8) in order to generate high pressure steam (col. 4, lines 48-55). Since Iijima, as modified by Fujii, is using a steam turbine to drive the compressor (S2), then it would be obvious to make use of the high pressure steam generated in Kobayashi's heat exchanger (54) and supply it to the steam turbine in order to drive the compressor (S2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make use of the high pressure steam generated in Kobayashi's heat exchanger by exchanging heat between a synthetic gas synthesized by the reformer and water, and to supply the high pressure steam to the steam turbine in Iijima as modified in order to drive the compressor.

4. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being as being unpatentable over Seiki et al. (US 6,875,794 B2) in view of Fujiii et al. (5,344,627).

With respect to claims 1 and 6, Seiki teaches a synthetic gas manufacturing plant (apparatus and method) comprising: a reformer (fig. 1, 10) having a reaction tube (11), a combustion radiation unit (12) arranged around the reaction tube (11) to heat the reaction tube (11), and a convection unit (13) communicating with the

combustion radiation unit (12); a source gas supply passageway (20_2) to supply a natural gas to the reformer (10); a steam supply passageway (20_3) to supply steam to the source gas supply passageway (20_2); a carbon dioxide recovery apparatus (30) to which a total amount of combustion exhaust gas flowing through the convection unit (13) of the reformer (10) is supplied, and which recovers carbon dioxide from the combustion exhaust gas; a compressor (51) to and compress the recovered carbon dioxide; a return passageway (20_{14}) to supply part or the whole of the compressed carbon dioxide from the compressor (51) to the source gas supply passageway.

Seiki discloses all claim limitations as set forth above but fails to show wherein said compressor is driven by a steam turbine. Fujiii teaches a system for removing carbon dioxide from a combustion exhaust comprising compressors to compress the carbon dioxide and comprising a steam turbine in order to drive the compressors (col. 4, lines 3-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a steam turbine in Seiki's apparatus, as taught by Fujiii, in order to drive the compressors.

Seiki further teaches a system comprising a heat exchanger (fig. 1, 52) to generate steam by exchanging heat in heat exchanger (52) between a synthetic gas (as illustrated) synthesized by the reformer (10) and water in order to generate high pressure steam (col. 7, lines 41-46). Since Seiki, as modified by Fujii, is using a steam turbine to drive the compressor (51), then it would be obvious to make use of

the high pressure steam generated in Seiki's heat exchanger (52) and supply it to the steam turbine in order to drive the compressor (51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make use of the high pressure steam generated in Seiki's heat exchanger by exchanging heat between a synthetic gas synthesized by the reformer and water, and to supply the high pressure steam to the steam turbine in Seiki as modified in order to drive the compressor.

5. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,486,218 B2) in view of Fujiii et al. (5,344,627), as applied to claims 1 and 6 above, and further in view of DePalma (5,575,274).

With respect to claims 2 and 7, Kobayashi discloses all claim limitations as set forth above but fails to show wherein a passageway area varying means is placed in the convection unit, and supplies the total amount combustion exhaust gas flowing in the convection unit to the carbon dioxide recovery apparatus. DePalma teaches a fireplace system having a passageway area varying means/damper (fig. 1, 54) placed in a convection unit/flue (52) (col. 6, lines 6-7), in order to control the total amount combustion exhaust gas flowing in the convection unit/flue (52) (col. 6, lines 20-23) and to vent it safely through the chimney (col. 3, lines 42-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a passageway area varying means in the convection unit of Kobayashi, as taught by DePalma, in order to control the total amount

combustion exhaust gas flowing in the convection unit/flue and to vent it safely through the chimney.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,486,218 B2) in view of Fujiii et al. (5,344,627), as applied to claim 6, and further in view of O'Rear et al. (US 6,896,707 B2).

With respect to claim 10, Kobayashi discloses all claim limitations as set forth above but fails to show wherein a portion of the compressed carbon dioxide not used as a source gas is supplied into the ground and fixed therein. O'Rear teaches fuel processing wherein carbon dioxide is supplied into the ground in order to reduce carbon dioxide emissions into the atmosphere (col. 11, lines 36-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to supply the portion of the compressed carbon dioxide not used as a source gas into the ground in Kobayashi's apparatus, as taught by O'Rear, in order to reduce carbon dioxide emissions into the atmosphere.

Response to Arguments

Prior Art Rejection

Applicant's arguments filed 7/12/2006 have been fully considered but they are not persuasive. Applicant argues that none of the references combined teach wherein the wherein a steam turbine is powered by steam for driving the compressor which is generated by exchanging heat between a synthetic gas synthesized by the

reformer and water and/or by exchanging heat with water in the convection unit of the reformer. Examiner respectfully disagrees. The combination of Kobayashi et al. and Fujiii et al. teach the limitation of driving Kobayashi's compressor by the steam turbine of Fujiii as set forth above, and Kobayashi teaches a system comprising a heat exchanger (fig. 1, 51) to generate steam by exchanging heat between a synthetic gas (20_7) synthesized by the reformer (10) and water (20_8) in order to generate high pressure steam (col. 3, lines 49-52), therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make use of the high pressure steam generated in Kobayashi's heat exchanger by exchanging heat between a synthetic gas synthesized by the reformer and water, and to supply the high pressure steam to the steam turbine in Kobayashi's as modified by Fujiii in order to drive the compressor

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KH

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9/16/2006

ALEXA DOROSHENK NECKEL
PRIMARY EXAMINER